

REMARKS

Claims 1 and 3-18 are pending in this application, and claims 11-13 and 15-17 are withdrawn. By this Amendment, claims 1, 3, 7, 9, 11, 13 and 14 are amended, and claim 2 is canceled. No new matter is added. Claims 1 and 14 are amended to comply with the requirements of 35 U.S.C. §112, second paragraph, claims 3, 9 and 11 are amended to correct grammatical errors, and claim 13 is amended for proper antecedent basis.

I. Allowable Subject Matter

Applicants note that claims 7-10 were rejected only under 35 U.S.C. §112, second paragraph. Thus, claims 7-10 would be allowable if the rejection under 35 U.S.C. §112, second paragraph, is overcome. Because the rejection is overcome for the reasons described below, claims 7-10 are in condition for allowance.

II. Rejection Under 35 U.S.C. §112, Second Paragraph

Claims 1-10, 14 and 18 were rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. This rejection is respectfully traversed.

The Patent Office alleges that the recitation "by capturing the odorant in the mixed gas and a function of recovering its capturing capacity by decomposing the captured odorant," in claims 1 and 14 is duplicative. To expedite the prosecution of this application, claims 1 and 14 have been amended to delete this recitation.

Claim 2 was rejected as allegedly not further limiting claim 1. To expedite the prosecution of this application, claim 2 has been canceled.

For the foregoing reasons, claims 1, 3-10, 14 and 18 comply with the requirements of 35 U.S.C. §112, second paragraph. Withdrawal of the rejection is thus respectfully requested.

III. Rejection Under 35 U.S.C. §103(a)

Claims 1-6, 14 and 18 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over JP 2002-029701 (JP 701) in view of DE 10115220 (DE 220) and U.S. Patent No. 6,294,276 (Ogino). This rejection is respectfully traversed.

The Patent Office acknowledged that JP 701 does not describe a fuel cell system (claim 1) or a hydrogen gas supply unit (claim 14) that includes an odorant treatment portion with a carrier carrying a porous adsorbent and a catalyst. The Patent Office introduced DE 220 as allegedly disclosing a zeolite or active carbon used to remove sulfur from a hydrogen rich gas stream, and introduced Ogino as allegedly disclosing use of palladium to purify hydrogen before the hydrogen is fed to a fuel cell.

Claims 1 and 14 require that a carrier carry both the porous adsorbent for adsorbing the odorant and the catalyst for decomposing the odorant adsorbed by the porous adsorbent. The palladium component of Ogino is apparently alleged to correspond to the required catalyst in claims 1 and 14. Applicants disagree with the Patent Office's allegations that it would have been obvious to one of ordinary skill in the art to have modified the fuel cell of JP 701 to have included palladium as disclosed by Ogino.

Ogino discloses a hydrogen generator supplier having a purifier 20, which due to removal of sulfur content produces a desulfurized gas. This desulfurized gas is fed into a reformer 30 with water vapor. The reformer 30 reforms the desulfurized gas and produces a hydrogen rich gas, along with carbon dioxide, which are then fed into the hydrogen purifier 40. See columns 9-10 of Ogino. Hydrogen purifier 40 includes a hydrogen separation film 42, which includes a film base that is coated with palladium or palladium alloy.

The purifier 20 of Ogino removes sulfur added to the city gas as an odorant. When sulfur is present in the gas prior to entry into the reformer 30, such sulfur lowers the activity of a catalyst included in the reformer 30 and inhibits the reforming reactions in the reformer

30. The purifier 20 is accordingly arranged before the reformer 30 to remove the sulfur content. See column 9, lines 51-63 of Ogino. The hydrogen purifier 40 separates hydrogen from the reformed gas produced by the reformer 30 and gives gaseous hydrogen of a high purity. See column 11, lines 41-43 of Ogino.

The hydrogen purifier 40 includes a hydrogen separation film 42 that may be comprised of palladium. See column 11, lines 44-45 of Ogino. The hydrogen purifier 40 separates hydrogen by taking advantage of the characteristic that palladium enables selective permeation of hydrogen. The hydrogen separation film 42 includes a film base that is composed of porous ceramic, porous glass or the like and is coated with a film of palladium or palladium alloy without pinholes. See column 11, lines 50-56 of Ogino.

Ogino does not describe that the palladium is part of a carrier, or that palladium can promote decomposition of an odorant adsorbed by the porous adsorbent of the carrier. Instead, Ogino teaches palladium in the form of a film without pinholes that enables separation of hydrogen from a reformed gas. If the palladium of Ogino were to have been included in a carrier as alleged by the Patent Office, the structure and function of the hydrogen separation film disclosed by Ogino would be destroyed.

Specifically, the hydrogen separation film 42 allows for the selective permeation of hydrogen. See column 11, lines 63-65 of Ogino. Components other than hydrogen cannot permeate the film. See column 12, lines 7-11 of Ogino. To put palladium into a carrier as alleged by the Patent Office would require that the palladium not be in film form, and it would not be continuous, and thus would not be able to function to selectively permeate hydrogen as required in Ogino (for example, because the other components would not be hindered from permeating past palladium in a non-film form). As such, one of ordinary skill in the art would not have modified the palladium of Ogino with any reasonable expectation of

success, knowing that a different form of palladium would destroy the function disclosed in Ogino.

Thus, one of ordinary skill in the art would not have been led to have modified the carrier of JP 701 to have included palladium of the hydrogen separation film of Ogino as alleged by the Patent Office.

Further, the hydrogen purifier 40 of Ogino is disposed downstream of the purifier 20 of Ogino. Due to the location of the palladium in Ogino, palladium in the hydrogen purifier 40 would not remove the odorant that is adsorbed in the purifier 20, as the sulfur is removed prior to reaching the hydrogen separation film 42 composed of palladium. Nothing in Ogino indicates that the palladium functions as a catalyst to promote decomposition of the odorant adsorbed by the porous adsorbent, as required claims 1 and 14, as the odorant is already removed by the time the gas reaches the hydrogen separation film 42. As such, one would not have combined JP 701, DE 220 and Ogino for this additional reason.

Thus, none of the applied references provide any reason or rationale to have changed the structure of Ogino to move palladium from a film to a carrier that also includes a porous adsorbent. For this additional reason, one of ordinary skill in the art would not have been led to have modified the carrier of the fuel cell of JP 701 to include the palladium described by Ogino.

Nothing in JP 701 and DE 220 remedy any of the deficiencies discussed above with respect to Ogino.

For the foregoing reasons, JP 701, DE 220 and Ogino, in combination or alone, fail to describe all of the features recited in claims 1, 3-6, 14 and 18. Withdrawal of the rejection is thus respectfully requested.

IV. Rejoinder

Applicants respectfully submit that, because claims 1, 3-10 and 14 are in condition for allowance for the reasons set forth above, claims 11-13 and 15-17 should be rejoined and similarly allowed as all withdrawn claims include the allowable subject matter of the elected claims. Thus, withdrawal of the Restriction Requirement and rejoinder of claims 11-13 and 15-17 are respectfully requested.

V. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1 and 3-18 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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